CLAIMS

1. A system (10) for providing high definition (HD) video images in a standard definition (SD) compatible format, comprising:

a system (12) for scaling down the HD video images to an SD video format;

a system (18) for encoding the SD video;

a system (22) for generating a fine detail map for each HD video image; and

a system (24) for storing the SD video and each fine detail map in the SD compatible format.

2. The system (10) of claim 1, wherein each fine detail map describes edge details in the HD video image.

3. The system (10) of claim 2, wherein the system (22) for generating the fine detail map includes:

a system for generating a threshold map having threshold values derived from a brightness level and an activity level of each region in the HD video image;

a system for comparing the threshold values to corresponding values in a high frequency image generated from the HD video image.

4. The system (10) of claim 3, wherein the system (22) for generating the fine detail map further includes a line reduction system that eliminates edge details that are greater than a predetermined distance away from other edge details.

5. The system (10) of claim 1, wherein the system (22) for generating the fine detail map comprises a compression system for compressing the fine detail map.

6. The system (10) of claim 1, wherein the fine detail map includes positive values indicating regions that require a positive boost, negative values indicating regions that require a negative boost, and zeros indicating regions that require no boost.

7. The system (10) of claim 1, wherein the system for encoding (18) comprises an MPEG-2 encoder, and the SD compatible medium comprises a DVD.

8. The system (10) of claim 1, wherein the SD video and the fine detail map are stored at a combined rate of approximately 5 megabits/second.

9. The system (10) of claim 1, wherein the fine detail map is stored at a rate of less than 1 megabit/second.

10. The system (10) of claim 1, further comprising an aspect ratio format system for formatting the SD video for widescreen, letterboxing, and scan and pan formats.

11. The system (10) of claim 1, wherein the SD video can be stored in a format selected from the group consisting of: progressive and interlaced.

12. The system (10) of claim 1, wherein the fine detail map is stored in an MPEG userdata field.

13. A playback system (30) for reconstructing a high definition (HD) video image from a standard definition (SD) format bitstream (24), comprising:

    a system (32) for extracting and decoding SD data from the bitstream;

    a system for extracting a fine detail map associated with each image from the bitstream;

    a system (34) for de-interlacing the decoded SD data; and

    a system (36) for up-scaling and post-processing the decoded SD data with the fine detail map to generate the HD video image.

14. The playback system (30) of claim 13, wherein the fine detail map comprises information relating to edge details extracted during a recording process.

15. The playback system (30) of claim 13, wherein the post-processing system (36) applies adaptive peaking after fine details have been added back to the video image using the fine detail map.

16. The playback system (30) of claim 13, wherein the post-processing system (36) applies luminance transient improvement after fine details have been added back to the video image using the fine detail map.

17. A method for recording high definition (HD) video images onto a standard definition (SD) compatible medium, comprising:

    scaling down the HD video images to an SD video format;

    encoding the SD video;

    generating a fine detail map (52) for each HD video image, wherein the fine detail map describes edge details in each HD video image; and

    storing the SD video and the fine detail map onto the SD compatible medium.

18. The method of claim 17, wherein the step of generating the fine detail map (52) includes:

    extracting high frequency image data (42) from a HD video image (40);

    creating a threshold map (44) having threshold values derived from a brightness level and an activity level of each region in the HD video image; and

    comparing (46) the threshold values to corresponding high frequency image data.

19. The method of claim 18, wherein the step of generating the fine detail map (52) further includes assigning a positive value to regions having a threshold value lower than corresponding high frequency image data, a negative value to regions having a threshold value higher than corresponding high frequency image data, and zero to regions having a threshold value equal to corresponding high frequency image data.

20. The method of claim 18, wherein the threshold values are lower for pixel locations in a center region of the image relative to pixel locations at a periphery of the image.

21. The method of claim 18, wherein the step of generating the fine detail map includes the further step of eliminating edge details that are greater than a predetermined distance away from other edge details.

22. The method of claim 18, wherein the HD video image (40) comprises an I frame, and the step of generating the fine detail map includes performing motion compensation for P and B frames.

23. A method of reconstructing a high definition (HD) video image from a standard definition (SD) format recording, comprising:

      extracting and decoding SD data from the recording;

      extracting a fine detail map (52) from the recording, wherein the fine detail map describes edge details relative to an importance threshold;

      de-interlacing the decoded SD data; and

      up-scaling and post-processing the decoded SD data with the fine detail map (52) to generate the HD video image.

24. The method of claim 23, wherein the enhancement information is stored in an MPEG userdata field.

25. The method of claim 23, wherein the decoded SD data is post-processed by applying adaptive peaking after fine details have been added back to the HD video image using the fine detail map.

26. The method of claim 23, wherein the decoded SD data is post-processed by applying luminance transient improvement after fine details have been added back to the HD video image using the fine detail map.

27. A program product stored on a recordable medium for generating a fine detail map to allow (HD) video images to be stored and played back from a standard definition (SD) medium, comprising:

      means (20) for extracting high frequency image data from a HD video image;

      means (22) for creating a threshold map having threshold values derived from a brightness level and an activity level of each region in the HD video image; and

      means for comparing the threshold values to corresponding high frequency image data.